Process-oriented Home Care System Transformation in Central Finland

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Keywords: Business Process Modeling, Central Finland, DEMO, Home Care.

Abstract: Due to aging population and rising expenses in health care, Central Finland's local governments and authorities are increasingly promoting home care rather than relying solely on institutional care. To increase the adoption of home care, it is necessary to create a mutual understanding of the current home care system, and to improve the cooperation of stakeholders. From the process perspective, after analysing 6 related organizations in Central Finland, this study created a general model of the current home care system in Central Finland by using DEMO Construction Model, and pointed out several problems in its real implementation. This study demonstrates that DEMO is applicable to the examination of essential processes in health care systems and can offer suggestions for improvement.

1 INTRODUCTION

The trend of aging population creates increasing demand for various resources in a healthcare system such as financial resources, staff, and facilities. However, the limited capacity of nursing homes and hospitals does not allow a universal coverage of institutional care, even in developed countries. There are also many senior citizens who prefer to live at home together with families, or even alone. Home care is therefore becoming an alternative to institutional healthcare. However, seniors in home care are often monitored less closely and they often face higher risks of falls, strokes, and heart attacks. It calls for a relative system transformation to support home care, especially the caring relationship between care professions and the aging people even at their home.

In Finland, local governments manage health care system. As Central Finland is sparsely populated, healthcare facilities are often located far from the patient's home and are not well equipped. Moreover, Finland is experiencing the problem of aging population (CIA, 2012), because of low birth rate and increase of life expectancy (Kunz, 2007). Therefore, it is vital to improve the effectiveness of healthcare and reduce the burden on institutional healthcare. The municipal authority of health care is aiming to increase the usage of home care to cover 90% of the domestic aging people. In this study, we selected DEMO (Design & Engineering Methodology for Organization) to create a general model for home care system in Central Finland. Based on it, we identified areas for improvement in the current implementation and provide suggestions for home care system transformation.

2 DEMO

Design & Engineering Methodology for Organizations (DEMO) is a cross-disciplinary method that is used to studies communication, information, and action within the context of an organization, based on PSI-Theory (Dietz, 2006). Unlike previous methodologies, DEMO considers communication as links to connect processes within or across organizations. DEMO is used in this study to describe authority and responsibility of abstracted actor roles, create a mutual understanding of business processes among the stakeholders, and compare similarities and differences of organizations. Comparing with other business process models, DEMO base on ontological modelling and has no limitation of requirement for detailed information in the implementation level. In addition, DEMO has also been applied to the domain

Tang J., Ruohonen T., Iijima J. and Pee L..
Process-oriented Home Care System Transformation in Central Finland.
DOI: 10.5220/0004179704550460
In *Proceedings of the International Conference on Knowledge Engineering and Ontology Development* (SSEO-2012), pages 455-460
ISBN: 978-989-8565-30-3

of healthcare in prior studies such as Habing et al. (2001), and Maij et al. (2000).

Based on Dietz (2006), DEMO contains methods for developing ontological models. The ontological aspect models consist of Construction Model (CM), Process Model (PM), Action Model (AM), and State Model (SM), which are highly correlated and interdependent. The CM explains the identified transaction types and their tree logic, as well as the associated actor roles. It defines the authority and responsibility of actor roles. The CM is also the most basic, concise and easy-to-understand model among the four aspect models. It is widely used in previous case studies and business consulting.

3 CASE STUDY BACKGROUND

In Central Finland, while the population is more than 270 thousands, 17.8% are aging people (i.e., >65 years old). The ratio of healthcare staffs to the population is only 1%. As a rule, the national health insurance, provided by KELA (Social Insurance Institute of Finland), basically covers all permanent residents of Finland, but Finnish health care system has been criticized for being inefficient due to the excessive number of units, health centres, hospitals, diagnostic services, and the density of administrative units in the system (Kokko, 2009). Health care is a critical and expensive service managed and financed by local municipal authorities. They decide domestic basic rules and laws. And they are also main contactors to access health care services under the coverage of national health insurance. Most of public health care institutions (e.g., hospitals, nursing homes, and home cares) are sub-organizations of municipal authorities. Nowadays, private health care gradually becomes the alternative to overcome the limitation of service availability from the public sectors.

In Central Finland, home care services under the coverage of national for demanders need to apply from the municipal authority of health care. Its main responsibility is to establish a home care policy (e.g., period, basic services, devices, potential caregiver list, and fee) according to the health and living situation of demander, together with the local annual budget for home care. After that, a home care caregiver (public or private) from potential caregiver list, selected by the demander, will execute the home care policy.

4 RESEARCH DESIGN AND ANALYSIS

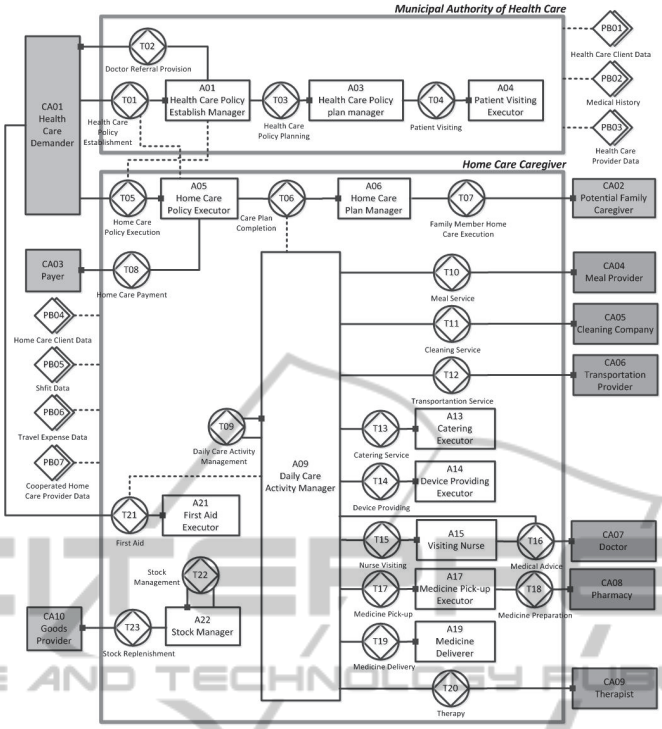
4.1 Research Design

In order to create a general model for home care system in Central Finland, we mainly studied six related organizations (one municipal authority of health care, three public home cares, and two private home cares), based on interviews and document reviews. In each organization, we interviewed two to three managers, team leaders and key staffs about key business processes and their daily works. We also matched the data from the interviews with the provided documents. Interviews and documents are mainly in Finnish, and cooperated Finnish research team translated team into English. According to these, we created CMs for each organization. Then, by comparing the similarities and differences in these six models, we generated the general CM for the home care system. This general CM was final validated by the Finnish research team and home care workers. In next part of this paper, we describe the general model by using Actor Transaction Diagram (ATD) and Transaction Result Table (TRT). TRT is considered from both ontological and implemental level by including the real initiator and real executor of each transaction.

4.2 General Construction Model for Home Care System in Central Finland

Figure 1 and Table 1 show the general CM for home care system in Central Finland by demonstrating key transactions, actor roles and information bask. According to the Finnish rule, it has been split into two parts: (1) health care policy establishment, executed by the municipal authority of health care; and (2) home care policy execution, executed by a public or private home care caregiver.

For the municipal authority of health care, the whole process is started by the health care demander (CA01), who is the aging people, requesting health care policy establishment form the health care policy establish manager (A01) by phone calls, emails, or face-to-face visits. Moreover, other people, such as a relative of the patient, social workers, and doctors etc., can also contact the authority on behalf of the patient in some cases. After received the requirement, for new demanders (CA01), the health care policy establish manager (A01) will build a new health care client account in the health care clien



Note: General Home Care System in Central Finland has been split into two parts: ***Municipal Authority of Health Care*** to establish health care policy for demanders, and ***Home Care Caregiver*** to execute related home care policy

Figure 1: Action Transaction Diagram of Home Care System.

Table 1: Transaction Result Table of Municipal Authority of Health Care.

No	Transaction Type	Result Type	Real Initiator	Real Executor
T01	Health Care Policy Establishment	Health Care Policy *p* for Demander *d* has been established	Demanders or Relative or Social Worker etc.	Care Manager
T02	Doctor Referral Provision	Doctoral Referral to establish Health Care Policy *p* for has been received	Care Manager	Demander or Relative or Doctor
T03	Health Care Policy Planning	Special Care Policy *sp* in Health Care Policy *p* for Demander *d* has been established	Care Manager	Special Case Handler
T04	Patient Visiting	Patient visiting of Demander *d* to establish Special Care Policy *sp* was finished	Special Case Handler	Special Care Handler or other
T05	Home Care Policy Execution	Home Care Policy *hp* for Demander *d* has been executed	Demander or Relative	Service Manager
T06	Care Plan Completion	Care Plan *cp* for Demander *d* according to Home Care Policy *hp* has been completed	Service Manager	Service Manager
T07	Family Member Home Care Execution	Family Member Home Care care in Care Plan *cp* has been executed	Service Manager	Relatives or Neighborhood
T08	Payment	Home Care Policy *hp* for Demander *d* has been paid	Service Manager	Aging People and Insurance Company
T09	Daily Care Activity Management	Daily Care Activity Schedule *s* has been managed	(Vice) Service Manager	(Vice) Service Manager
T10	Meal Service	Meal service has been provided	(Vice) Service Manager	Municipal Kitchen or other
T11	Cleaning Service	Cleaning service has been provided	(Vice) Service Manager	Cleaning Company
T12	Transportation Service	Transportation service has been provided	(Vice) Service Manager	Taxi Company or other
T13	Catering Service	Catering service has been provided	(Vice) Service Manager	Nurse or other
T14	Device Providing	Necessary device has been provided	(Vice) Service Manager	Nurse or other
T15	Nurse Visiting	Nurse visiting has been provided	(Vice) Service Manager	Visiting Nurse
T16	Medical Advice	Medical advice has been provided	(Vice) Service Manager	Doctor
T17	Medicine Pick-up	Medicine *m* has been picked up from pharmacy	(Vice) Service Manager	Nurse or other
T18	Medicine Preparation	Medicine m has been prepared	Nurse	Pharmacy
T19	Medicine Delivery	Medicine *m* has been delivered to client	(Vice) Service Manager	Nurse or other
T20	Therapy	Therapy has been provided	(Vice) Service Manager	Therapist
T21	First Aid	First Aid *f* for Demander *d* has been provided	Aging People	Nurse (Day) Taxi Company (Night)
T22	Stock Management	Stock for Stock Management Period *st* has been managed	(Vice) Service Manager	(Vice) Service Manager
T23	Stock Replenishment	Stock for Stock Management Period *st* has been replenished	(Vice) Service Manager	Goods Provider

data (PB01) for them. If the necessary information of personal medical history (PB02) and health care provider availability (PB03) is not available, the health care policy establish manager (A01) have to request them from the information taker, on a case-by-case basis. The doctor referral provision (T02) is also required in some specific cases to check the patient's health condition. Based on all these information, for a simple case or a temporary care case that requires common health care package they have, the health care policy establish manager can establish the health care policy (T01) directly. More complicated cases are passed to the health care policy plan manager (A03) for more detail health care policy planning (T03). If necessary, the health care policy plan manager (A03) may request a patient visiting executor (A04) to visit the demander at home or care institute (T04) to examine his/her actual health and living situation. When the health care policy establishment (T01) is completed, the health care demander will be informed about the type and period of service he/she can receive, the potential providers, and the fee for the service.

According to the health care policy, if the policy assigns the health care demander (CA01) needs home care, he/she should select one of caregivers from the potential providers list, and contact or meet an officer there. The home care policy executor (A05) will check whether the demander has completed the processes at the administrative office from municipal authority of health care before executing the home care policy (T05). The home care plan manager (A06) will then be requested to complete the care plan (T06) for demander. In some cases, the home care plan manager may request potential family caregiver (CA02), to execute the family member home care (T07) at home. When the home care service finished or the end of each month, the payment (T08) is then paid by the payer (CA03) (e.g., insurance company, and demander). For the daily job, the daily care activity is managed (T09) by the daily care activity manager (A09). Based on the daily care activity schedule, the daily care activity manager (A09) will assign the job to nurses or outsource the job to other companies (e.g., meal provider, cleaning company). Meal provider (CA04) serves meal (T10) according to the request from the daily care activity manager (A09). Cleaning service (T11) is done by the cleaning company (CA05). When the aging people need transport (e.g., shopping), transportation provider (CA06) will provide transportation service (T12) according to the booking appointment. The catering executor (A13), who may be a nurse in public home care or a non-medical worker in private home care, executes the catering service (T13) such as taking a shower for the aging people, feeding food, and giving medicine, etc. Devices for aging people such as forearm crutch, wheelchair, etc. are provided (T14) will be delivered and set up by the device providing executor (A14). The visiting nurse (A15) does temporary or regular nurse visiting (T15) to give medical checking and basic treatment for demanders. If the health situation of a demander changed, the home care workers need to contact to the doctor (CA07) for medical advice (T16). In some organizations, the visiting nurse (A15) will also regularly communicate the doctor (CA07). It can be seen that most of the medical jobs are carried out by the visiting nurse. Medicine pick-up executor (A17) will go to pharmacy to pick up the medicine (T17) for health care demanders. The pharmacy (CA08) is responsible for preparing and packing the medicine (T18). Then, the medicine deliverer (A19) will be requested to deliver the medicine (T19) to the demander. In most of cases, a nurse is assigned to deliver medicine when he/she provides other home care services for the same demander. The cooperated therapist (CA09) does the home visit therapy (T20) for demanders when required. After all the home care workers finish their job everyday, they have to update client data (PB04) and report transportation fee (PB06). In addition, most of home care demanders will be provided an emergency alarm at home. When there is any emergency case, the first aid executor (A21) will provide first aid service (T21) to the health care demander (CA01), and then report the result to daily care activity manager (A09). During the daytime, there are some nurses in charge of picking up the phone call. But at the nighttime, the first aid service (T21) is always outsourced to other institutes, which provide 24 hours services, as the private nursing home or the taxi company. The taxi company will be called to send a taxi to the aging people's house. For the serious case, the taxi has to go to the hospital to take the night nurse to the demander's house. The stock manager (A22) is in charge to manage the stock of goods (T22), and order goods from providers (CA10) to replenishment the stock (T23). There are four information banks inside: home care client data (PB04), shift data (PB05), travel expense data (PB06), and cooperated home care provider data (PB07).

In addition, in the implementation, a key difference between the public home care and the private home care is that the private one tends to outsource all medical services (T15, T16, T17, T18, and T19) to others, as private clinics or private visiting nurses.

5 DISCUSSIONS

In previous section, we identified the general model of home care system in Central Finland based on DEMO. It provides a mutual model for us to understand the main transactions in the home care policy establishment and execution, as well as their interdependencies (illustrating by two information links). In Figure 1, the information link from T01 to A05 refers to that health care policy establishment (T01) in municipal authority of health care is the premise for home care policy executor (A05) to provide home care services to demanders. And the information link from T05 to A01 demonstrates that home care policy execution (T05) is critical resources for health care policy establish manager (A01) to follow up the current situation of demanders to improve the health care policy.

5.1 Problems in the Implementation

One benefit of DEMO is to abstract essential transactions and related actor roles in the ontological level, which define the authority and responsibility of actor roles. In turn, it helps to assess the real implementation related to define and distribute responsibilities across functions. In this part, using the validated general CM model as a stepping stone, we will discuss several critical issues in the implementation of the previous general construction model.

First, in the implementation, necessary information related to one transaction can be provided by the real initiator or found out by the real executor. For the transaction, the home care policy execution (T05), the initiator of this transaction is the home care demander. Because of that the demander, especially aging people, is lack of capability to fully understand and explain the health situation of himself/herself, the executor, home care policy executor (A05), has to find out information. Moreover, it is also difficult for home care nurses to assess it from the appearance and behavior of demanders. In addition, because of the security consideration and the difference of e-health record system among organizations, the exchanging of data across organizations is difficult (Invest in Finland, 2011). So, before promising the home care policy execution (T05), the home care policy executor (A05) has to contact with related information holders to access the data. It is an extremely time consuming step in most of our examples.

Second, as the general CM of home care systems has been split out into two parts. Not only their separated domain, a mutual understanding and definition of their interdependency is also critical for the alignment. However, it has been missed in the current home care system of Central Finland. The information sharing efforts have not been standardized and highlighted between the municipal authority of health care and the home care caregiver.

Third, the home care demander can get the regular treatment and health checking from the visiting nurses (A15) at home. For better service, the visiting nurse (A15) needs to communicate with the doctor (CA07). Currently, there are multiple ways as e-mail, phone call, or the Pegasos, instead of face-to-face visiting. Pegasos is a patient information system widely used in Finnish public health care sector (Invest in Finland, 2011). However, because of the in-charge visiting nurse and doctor are usually not fixed for each home care demander, the transaction, the medical advising (T16), is still full of challenges. It needs to emphasize the responsibility of the visiting nurse to initiate T16, and to develop better methods and technologies for better health situation control and more efficient communication between the visiting nurse and the doctor.

Fourth, the process of delivering medicine (T19) to the demander (CA01) seems to involve various actor roles such as the medicine pick-up executor (A17) and medicine deliver (A19). The long and multi-actor process may increase the possibility of a drug misadventure (i.e., (1) “an inherent risk when drug therapy is indicated”; (2) “incident created through either omission or commission by the administration of a drug or drugs during which a patient is harmed”; (3) “incident whose outcome may or may not be independent of pre-existing disease process”; (4) “incident which may be attributable to error, immunological response, or idiosyncratic response”; and (5) “incident which is unexpected and thus unacceptable to patient and prescriber” (Schommer, 2000)). Therefore, it is better to enforce clear steps on the process to reduce the risk.

Fifth, emergency management is a key aspect of home care system. Because of the real executors of first aid (T21) at the daytime and night time are different, as well as some non-professional caregivers such as taxi drivers are included, it is a transaction integrating multiple actors. It not only needs a high coverage of the new equipment, as emergency alarms, but also requires a clearer description of actor’s responsibility and action steps.

Additionally, according to Table 1, a nurse is assigned to complete the jobs as catering (A13) and medicine deliver (A19). This can be a hidden problem. Based on the expertise from special training, nurses can carry out various medical and non-

medical tasks. For example, serving meals, taking a shower for aging people, and cleaning the stuffs, We can see that instead of doing more medical related tasks, nurses need to spend time on many non-medical tasks, which do not require their profession and expertise.

5.2 Suggestions for Home Care Transformation

Based on previous discussion, the following suggestions are proposed.

First, in order to support the information sharing among stakeholders in the home care, we suggested establishing the national healthcare database for all the residents to provide a basic standard. By applying this method, both public and private home care caregivers as well as home care demanders can access the same database and retrieve the necessary information such as medical history and health situation. For the security consideration, the related health card can be launched as a method for stakeholders to access the national healthcare database. Especially, it is likely to increases the efficiency of ordering phase (including request and promise) in the demander-initiated health care process, as T01 and T05 in Figure 1.

Second, as mentioned before, in current home care system, a main difference between public and private home care caregivers is that the private ones tend to outsource all of their medical services to others and the nurses who have a rich medical expertise and capacities have to do many non-medical tasks. Therefore, the effectiveness of the whole home care system is likely to improve if the public and private sectors can collaborate to complement each other in providing medical and non-medical services. Furthermore, it can solve the problem of informational sharing from public sectors to private sectors as an alternative to the national healthcare system, because the public sectors can access the client information from Pegasos while the private ones cannot. They may start exploring how to collaborate by considering and resolving issues related to law, culture, privacy, etc.

6 CONCLUSIONS

As Michael Porter pointed out, the health care in 21st century is currently delivered by the business model of the 19th century (Porter and Teisberg, 2006). Health care services and systems need to keep up with shifting technological improvements, medical development, and changing aging people needs. It is also essential to establish a mutual understanding about the home care system. Based on the interview and document, we identified CMs for six home care institutes in Central Finland, and then extracted the general model of home care system. Next, we also assessed the home care implementation related to the attribution of responsibilities among real actors. This study contributes to practice by creating general construction model, identifying some critical issues in practice, and showing some potential solutions to enhance the home care system in Central Finland. In this study, only the construction model has been developed, other DEMO aspect models can be further analyse. They may give some foundations of an integrated model of healthcare services.

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